Title: Tycoon Toons-An Integrated Project Based Unit: Data Analysis-Tally Table Pictographs, Bar Graphs

Brief Overview:
In this unit, students try to win a contest by creating the best new cartoon. This is a project based unit that integrates Language Arts and has students conducting surveys and polls and organizing the data into tally tables, pictographs and bar graphs.

NCTM Content Standard:
Data Analysis and Probability
- Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them
- Select and use appropriate statistical methods to analyze data
- Develop and evaluate inferences and predictions that are based on data
- Create and use representations to organize, record, and communicate mathematical ideas

Grade/Level:

Grade 2

Duration/Length:

Average of 60 minutes per lesson

Student Outcomes:

Students will:
- Collect data by conducting surveys and polls
- Collect and interpret data in tables
- Organize, display and data to make pictographs using a scale of 1:1, and single bar graphs
- Interpret data contained in pictographs using scales of 1:1 And single bar graphs of a variety of categories and intervals of 1

Materials and Resources:

- Student Resources 1-14
- Teacher Resources 1-3
- Sentence strips
- Sidewalk chalk
- Index cards
- Poster board
- Graphing paper
- Capitalize the first letter of each bullet

Lesson 1   Tally Marks and Tables

Preassessment – Draw two columns on the chalkboard. In column A display the number 15. In column B show the number 15 represented by tally marks. Ask the students: What does column A say? [15] What does column B say? [15] How are columns A and B alike? [They both symbolize the same number] How are columns A and B different. [Column A has the number 15 while column B shows the number using tallies] If I wanted to count column B by 5's how will I know what sets to count? [Every diagonal line represents the 5th number]

Launch – Tell students that you are going to spell six names and you want them to count on their fingers every time you say a vowel. [TR1] Ask: How many times did I say a vowel. Was it easy or hard to keep up with me as I said the vowels? Why was it so hard? [We ran out of fingers] Tell them you are going to show them a fast easy way to organize the information so that they can look back at it and have the same information and will not have to worry about running out of fingers.

Teacher Facilitation – Display TR2 on the overhead. Tell students to spell each name slowly. Tell students that every time they hear a vowel to say "TALLY". Model for students the correct way to complete a table [TR2] by using tally marks. When you reach your first 5th vowel be sure to stop and explain that you are placing the 5th tally mark diagonally across the other four tally marks because that makes the table easy to read later. Complete tally mark chart for table TR2. Count the tally mark portion of the table by 5's. Be sure to reiterate that every diagonal line means that the tally mark set is complete and has only five counts. Then move to the number portion of the table. Tell students that the number is recorded to make the table easy to read, because people can look at the table quickly and know the total number of vowels without having to count the tally mark sets by 5's. Have the students count the tally mark set by 5's again and when complete ask: What number should I put in this total amount of vowels column?

Student Application – Distribute SR1. Tell students that they are going to be working on this project for the next week and all completed work will be placed in their math folders for later use. Take the time to fully explain and take questions from students about the unit. Then distribute SR2. Tell students that they will be polling all second grade classes. (If it is not possible for your entire class to go to the other second grades send one student or poll the other second grade ahead of time and display the results for students to add to your class's results.) Tell students that you will read the three settings and they are to pick what setting they think sounds the most interesting for a cartoon. ASK: Why is it important to only vote one time? [If you vote more than once your total count will be off.] Have students fill in the tally mark portion of SR2 by using tally marks. Then have students complete total column by counting all the tally marks and writing a numeral in the column.

Embedded Assessment – Have students analyze the data of the table by answering the questions on page SR3.

Reteaching/Extension –

- For students that have a hard time understanding how to make tally mark sets, give them SR4. Have them practice converting numerals to tally marks and tally marks to numerals. Be sure they are able to compare tally mark sets.
- For homework have all students watch television for a half hour. Have them create a tally mark table for the amount of commercials they saw during that 30 minute period.

Lesson 2   Pictographs/Characters
Preassessment – Have students complete SR5. Make sure students are able to fill in the tally mark table correctly with a title and they are drawing the correct tally mark charts.

Launch – Ask students who their favorite cartoon characters are. Take three of the characters and tell them that you are going to show them another way to represent data by using a graph instead of a chart. Have students assemble in the back of the room where you have the floor graph mat laid down and properly labeled. Label the y axis with the three cartoon characters the students offered. Tell students that they have three choices from which to choose. Call students by name and tell them that they will not raise their hands to vote but instead they will stand on one square on the same line as the character they want to vote for as being their favorite. Ask: Are tally marks representing the vote here? What represents each vote? [a person]

Teacher Facilitation- Tell students that they just created a 3-d version of a pictograph. In their journals have students copy this definition for a pictograph;- a pictograph is a graph that uses ONE symbol to represent data. Explain that pictographs are a good way to represent data because they can be quickly and easily read, and they serve as an attractive way to present data, which would look nice on their final display boards. Take a vote again on the favorite characters that were used to complete the floor mat graph. This time make three different tally mark charts, one for each character. Ask: How many charts do I have here? [3] Tell students that you are going to show them how to organize all that data on one chart. Draw an x and y axis on the overhead. Demonstrate and tell students that on the line going up and down you are going to write the three cartoon characters they gave you. Then tell students that for each vote you are not going to use a tally mark but a smiley face instead. Tell students that you are going to make a key so that people can understand what each smiley face stands for. Draw the key with each smiley face equaling one vote. Then tell students that you need a title for your pictograph, so people will know what the graph is about. Ask: What is this pictograph going to tell us? [our favorite cartoons] So what do you think about RM_____'s Favorite Cartoons? Title the graph. Review the process of making a pictograph. Point to the key and ask: What is this called? Why? Point to the title and ask: What is this? Why do we need a title on our graph? Point to the y axis ask: Why did I write these three characters on this line? [that's what was voted on] Refer back to the tally chart. Tell students that for every tally mark you need to draw one smiley face. Ask: For the first character, how many people liked this character most? How do you know? [counted tally marks] How many smiley faces

do I need to draw on the same line as this first character? [pictures must match tally marks] Repeat for the other two. Ask: What character got the most votes? Say: When we are drawing graphs, whatever column has the most pictures or highest number/frequency, is called the mode of the graph. Then have students place mode which means most in their math journals. Ask: How many more (fill in with whatever got the most votes) do I have than (fill in with whatever got the least votes)? Demonstrate the easy way to tell by putting a pencil on the last picture in the column that got the least votes and make sure the pencil is lined up with the mode column. Then have students count the extra pictures in the most column where the least stops and that will tell them how many more. How many people voted in all? Demonstrate to students that to find the total number of people that voted they must count all the pictures in the graph, not including the key. Be sure to stress that they should not count the picture in the key. Also, be sure that students understand that the pictures must be lined up directly over top each other, not all over the place. Do not allow children to continue rows of pictures/symbols for one column to another row, have them add paper as needed, to continue the symbols in a horizontal line.

Student Application – Tell students that they are going to conduct a survey to find which three characters they should include in their cartoon. Split students into three cooperative groups. Be sure to assign cooperative group roles. Give each group a different survey. Tell students that you will give each group a different survey because they will be taking the mode of each graph in order to pick the three characters for the survey. Distribute SR6. Poll all second grade classes.(If it is not possible for your entire class to go to the other second grade send one student or poll the other second grade ahead of time and display the results for students to add to your class's results.) Have students collect data using the tally charts first. Assess students' understanding of tally marks and how many total votes each character had. Distribute SR7. Have students fill in the pictograph with the appropriate symbols making sure each group's pictograph matches their tally mark chart. Have each student complete SR8 to analyze their group's data.

Embedded Assessment – Have each group pass a pictograph that one of their group members made to the left one time. Each group should end up with a different pictograph. Give each student another SR8 and have them complete it using the other pictograph. Note that some of the questions on SR8 will have to be filled in after the data has been gathered.

Reteaching/Extension – For students that are struggling, reteach the important parts of a pictograph, how to find the mode, and how to compare the data. For homework, give all students the following assignment: I would like to know how many dress shoes and how many sneakers are in your home. Create a pictograph using the worksheet SR9.

Lesson 3 Bar Graphs/Problem
Preassessment – Distribute SR10. Have students complete Venn diagram.

Launch – Remind students that the day before, they created a pictograph to determine who their three main characters of the cartoon were going to be. Tell them today they are going to create a different type of graph to determine the plot of the story. (If you have not covered plot yet replace the word plot with the word problem). Remind students that the plot is the main action of the story. The plot is the main problem that exists for the story's character. Ask: What are some of your favorite plots/problems from some stories we have read so far this year in our anthologies? [For example, one of my favorite plots comes from the Open Court Anthology from the story, The North Wind and the Sun, where the friends are arguing to see who is stronger. On a bar graph I would label that plot as *problems with friends*.]   Write down the student's responses. Take only three or four responses. Tell the students that you are interested in seeing what your students' favorite plots have been so far this year. Tell them that you are going to show them how to display that data by using a bar graph.

Teacher Facilitation – *If the following activity is not possible, simulate the activity in the classroom, drawing the x and y axis on the board and continuing the activity as noted.* Take students outside and on the blacktop, and using sidewalk chalk, draw an x and y axis. On sentence strips of the same color write the three or four plots that students offered. Label your y-axis (vertical)-Students. Tell students that this line is going to represent the number of students who voted for each category. Ask: What number do you think I should start with? I want to start with the lowest number of people that might vote for each category? Elicit from the students that you want to start with 0 because it is possible that no students may vote for a particular category. Draw the scale of intervals of 1 for students being sure to make the lines explicit. Ask: On these sentence strips I have written what a few of you have said were your favorite plots so far in anthologies. All of us are going to pick which of these we liked the best. Where should I place these sentence strips on the graph? [on the x axis] Using tape lay the sentence strips on the ground. Hand each student an index card. Tell them they are going to use the index cards to vote, however they must make sure that their index card is touching another index card on both sides, there should be no gaps. Complete the bar graph. Ask: Every graph needs a title. What should we title this bar graph? Label the graph with the title using sidewalk chalk. Ask: What is the mode of this graph? If students struggle remind them that the mode is the most. Ask: How many less votes did _____ get than _____? Model for students that they are to start at the end/top of the bar with the least and count all the lines up until they get to the top/end of the bar with the most. Tell them the number they count is the answer. Make sure students are counting each line by one and are not starting at the number that the bar ends with. How many more votes did _____get than_____? Again, model for students the correct way to find how many more votes by starting at the top of the higher bar, counting down and stopping at the top of the lower bar. When you return to class, replicate the bar graph you created outside on graphing paper on the overhead, demonstrating to students how to complete the graph.

Student Application – Have students complete SR11 and SR12. If graphing paper is not available use SR13.

Embedded Assessment – Teacher should observe student's process on the SR11 and the bar graph and SR12 for assessment.

Reteaching/Extension – If students are having troubles with the bar graph, go over the process for making and reading a bar graph in a small group setting. To extend this project have students create a bar graph where the intervals are by 2's.

Summative Assessment:

Now is the time to put the entire project together from lessons 1-3. This is a project based unit. Have students get all of their graphs and tables together. Have them write a friendly letter to the president of Tycoon Toons. Tell them that their letter must tell where the cartoon should be set, who the characters should be, and what the plot of the first show should be. Tell them to justify their answers by referring to the data from their graphs [SR14]. Display all SRs_____ and the friendly letter on poster board display and have students come up with a name for the cartoon which will be the title of their project. The students should be able to justify their picks for the cartoon by using mathematical terminology, and they should be able to identify the mode of the graph, and tell how many more votes one thing got over the other. To extend this assignment even farther, have students write the first cartoon as a creative story.

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Names for Tally Mark Activity-TR1

1. Irene Village
2. Kamara Jahi
3. Madison Graine
4. Renee Perez
5. Keesha Bullock
6. Derrick Poorter

Vowels in Names Table-TR2

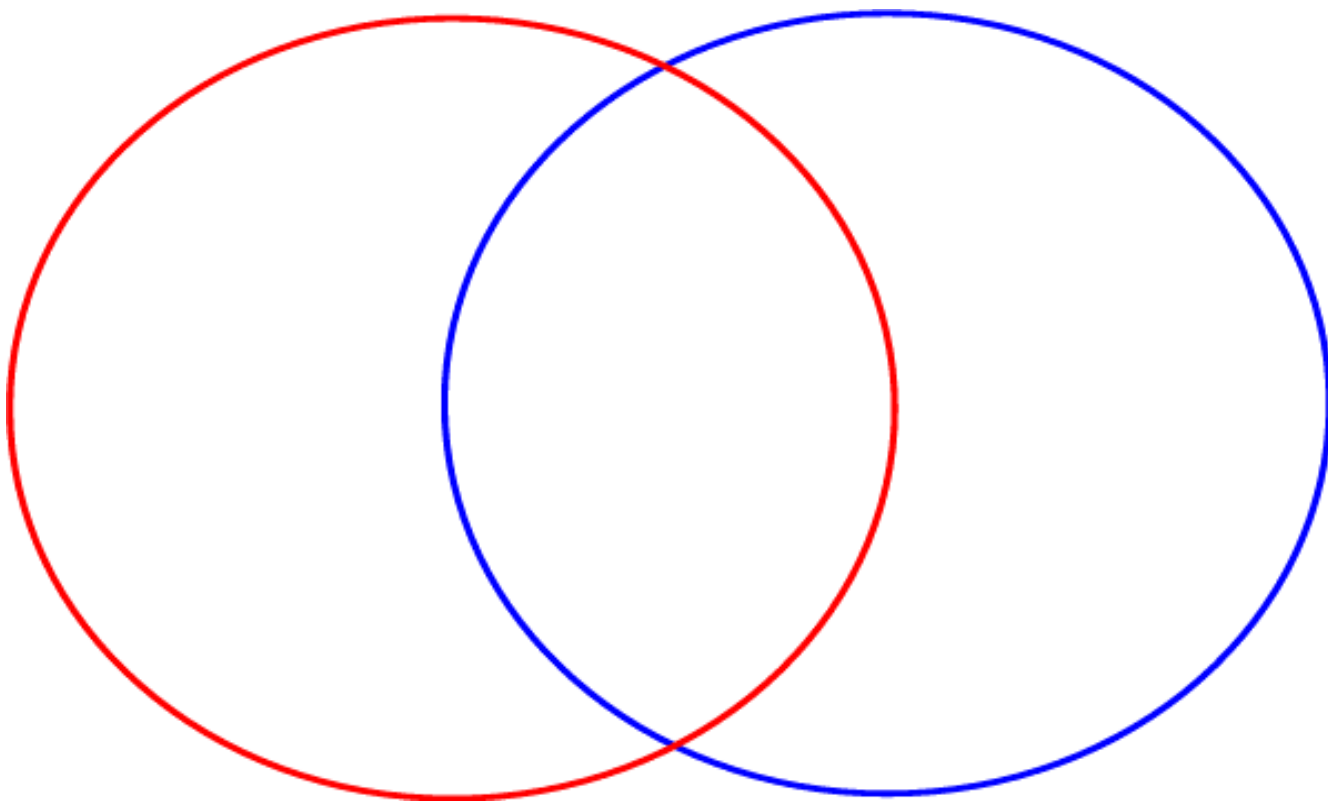| Name	Tally Marks	Total Number
Irene Village		
Kamara Jahi		
Madison Graine		
Renee Perez		
Keesha Bullock		
Derrick Poorter		

Name:_____

Date:_____

Directions: Label the red diagram *Pictographs*, label the blue diagram *Bar Graphs*, and label the middle *Both*. Compare pictographs and bar graphs by completing the Venn diagram.

<u>Venn Diagram</u>

Name:_____

Tycoon Toons Contest

Tycoon Toons is about to go out of business because they have not had a hit cartoon on air in over twenty years. They are holding a national contest to see if any of their loyal fans has the creativity it takes to design a hit show. Your job is find out what type of cartoon do people want to see the most.

Over the next week you will be taking several polls and conducting various experiments to see what is the current demand for quality cartoons. Your end product will be an ad for your cartoon, listing and describing the characters, setting, a first show plot, and a letter to the president why he or she should pick your cartoon. You must also display the graphs used to justify your answers. The winner receives a big prize. Happy Working!!!

Name_____

Sometimes the most interesting part of a cartoon is the setting. Remember that a setting is the time and the place a story happens. Poll the second grade classes to see what place on this list seems the most exciting. Be sure that your tally marks are written correctly and your total number column matches your tally marks column.

Most Exciting Settings for a Cartoon

Settings	Tally Marks	Total Number
Baltimore,MD year 2035		
New York City year 2003		
Washington, DC year 1976		

Name:_____

Date:_____

The Best Setting for Our Cartoon

1. **What will be the best setting for the cartoon? Explain.**_____

_____

_____

_____

2.   **Describe how you showed the fifth vote when you were displaying your data using tally marks?**

_____

_____

_____

3. **How many students voted in all?**

_____

4. **Describe how the setting that got the most votes might look.**

_____

_____

_____

_____

_____

_____

_____

Name:_____

Date:_____

Tally Marks

Convert the following tally marks to numerals.

1. ~~IIII~~ III _____

2. IIII _____

3. ~~IIII~~ ~~IIII~~ III_____

Convert the following numerals to tally marks.

4. 6 _____

5. 15_____

6. 2_____

7. 7_____

Name:_____
Date:_____
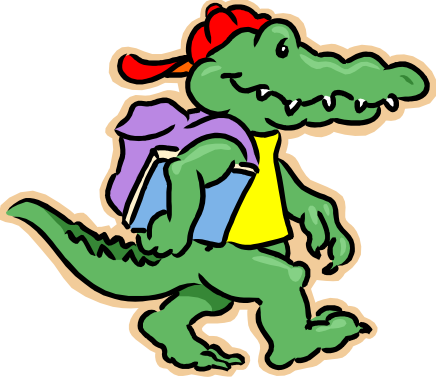
Lisa wants to buy a new shirt to wear to the basketball game. The man at the store told her she would need to pay for each consonant in her name. The vowels are free. Lisa's entire name is: Lisa Hamilton. Complete this tally chart to show how many letters Lisa is going to have to pay for.

Title:_____

Consonants	Tally Marks	Total

Group 1

Names:_____
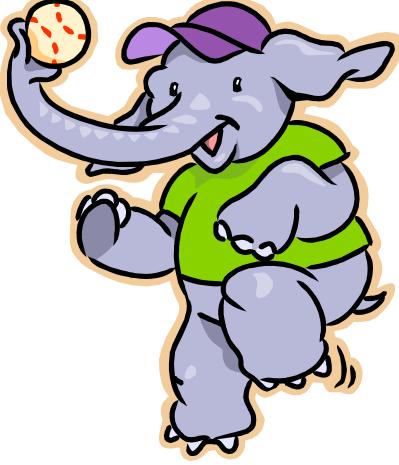
Title:_____

Directions: Pick your favorite character from the choices above.

Group 2

Names:_____

Title:_____

Directions: Pick your favorite character from the choices above.

Group 3

Names:_____

Title:_____

Directions: Pick your favorite character from the choices above.

Name:_____

Group 1

Directions: Each member of your group is to use the data from the tally mark chart to complete the pictograph below.

Title:_____
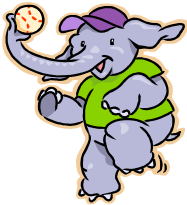

Key: ☺ =1 vote

Name:_____

Group 2

Directions: Each member of your group is to use the data from the tally mark chart to complete the pictograph below.

Title:_____

Key: ☺ =1 vote

Name:_____

Group 3

Directions: Each member of your group is to use the data from the tally mark chart to complete the pictograph below.

Title:_____

Key: ☺ =1 vote

Name:_____

Date:_____

Directions: Use your Favorite Characters pictograph to complete the questions below.

1.   What is the mode of your pictograph?   How do you know?_____
_____
_____

2.   Explain how someone can find out how many people voted in all.
_____
_____
_____

3.   How many more people voted for _____than _____?
_____
_____

4. Which column has the least?
_____
_____

5. How many people voted for the character in the first column?_____

6. Write a paragraph describing the personality of the character that was the mode of your group's pictograph.
_____
_____
_____
_____
_____
_____
_____

Name:_____

Date:_____

Directions: Count how many dress shoes and sneakers are in your home. Complete this pictograph using that data. Remember only use one symbol or picture to represent your data.

1.

_____

2._____

3._____

4.

Student Resource 10
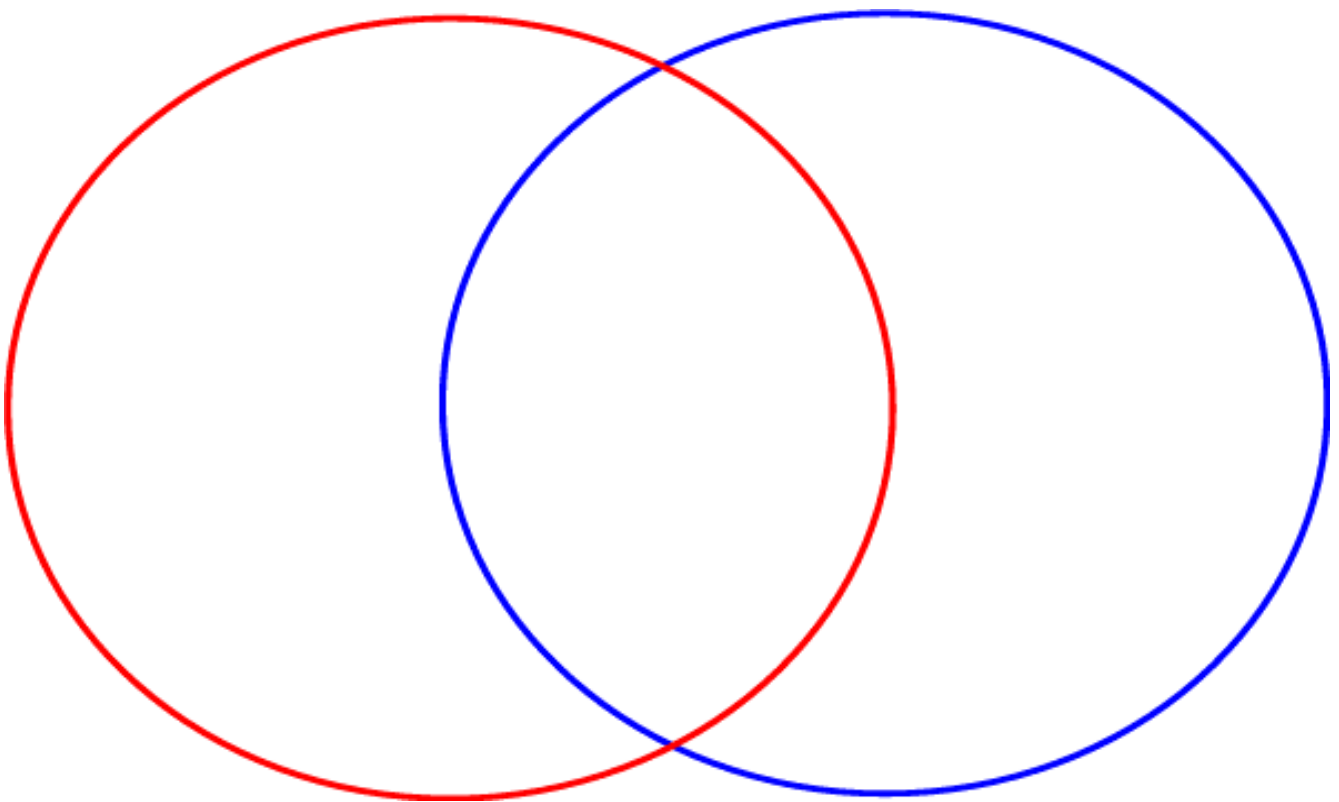
Name:_____

Date:_____

Directions: Label the red/left diagram *Pictographs*, label the blue/right diagram *Bar Graphs*, and label the middle *Both*. Compare pictographs and bar graphs by completing the Venn diagram.

<u>Venn Diagram</u>

Name:_____

Date:_____

Directions: The tally chart below represents the vote of the entire second grade about which plot they would like to see first on the cartoon. Use this data to create a bar graph using the attached graphing paper.

Favorite Cartoon Plots of the Second Grade

Plot	Number of Votes
School Bully	卌 卌 卌 IIII
Lost Money	卌 II
Bad Grades	卌
Family Death	卌 卌 卌

Name:_____

Date:_____

Directions: Analyze the data of your bar graph by answering the following questions.

1. **Write three sentences that tell facts about your bar graph.**

   _____
   _____
   _____
   _____

2. **What is the mode of the graph?**

   _____
   _____

3. **How many more votes did School Bully get than Lost Money?**

   _____
   _____

4. **How many less votes are there for Bad Grades than Family Death?**

   _____
   _____

5. **How many people voted all together?**

   _____
   _____

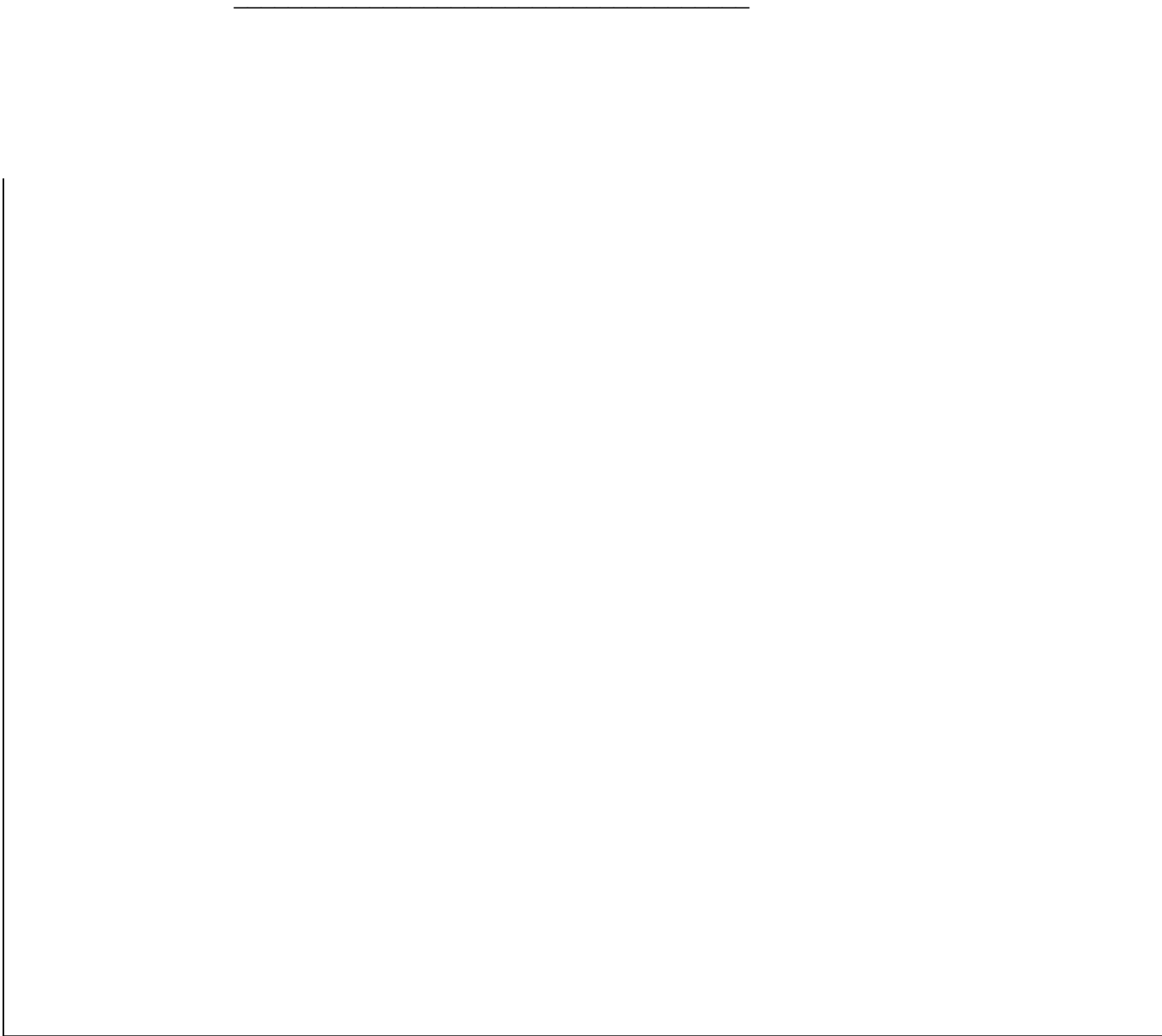6. **Write a paragraph about a time when you had to deal with one of the problems that are on the bar graph**.

_____
_____
_____
_____
_____
_____
_____
_____

Name:_____

Date:_____

Directions: Label and complete this bar graph using the data from the Plot tally chart.

_____

Name:_____

Date:_____

On writing paper, write a friendly letter to the president of Tycoon Toons. The letter must state where the cartoon should be set, who the characters should be, and what the plot of the first show should be.

Justify your answers by referring to the data from your graphs. Be sure to talk about the mode and tell how many more votes one thing got over another. Also, tell the president of Tycoon Toons what the title of the cartoon should be and explain why you picked this title.